ALIGNMENT

With the Common Core

STANDARDS:

A 21st Century How-to Model for Successful CTE Programs

BY SCOTT BURKE

How do you measure success in a career and technical education (CTE) program? In our work with CTE teachers and administrators across the country, we understand that success depends upon individual job responsibilities and pressures. From the perspective of CTE teachers, common benchmarks of success typically include strong student and parental support for CTE, thriving enrollment in CTE classes, and feeling valued despite a "college-for-all" push. Interestingly, administrators and district-level decision-makers report similar benchmarks of success—with one exception: greater weight is placed on CTE's role in fortifying standardized test scores.

Many CTE teachers believe that their primary role is to offer and teach CTE classes. If so, administrators ought to be responsible for building a master schedule to fill the seats, provide appropriate funding, and fully support the departments as they go on with business as usual. Conversely, administrators believe their teachers ought to be responsible for maintaining current, academically rigorous and engaging content; producing measurable results related to high stakes tests; and networking to build strong relationships with all stakeholders. It is rare to find administrators and teachers who are on the same page about *who* takes on *what* responsibilities. Unfortunately, if these tensions are not mediated productively, much finger-pointing and blame-shifting occurs between the two groups. This is counterproductive to transforming quality 21st century CTE programs from good to great. Regardless of which perspective you take, we believe that both groups are right.

Seven years ago, we were two teachers from two different content areas (CTE: Trade/Industry and Math) with seemingly irreconcilable worldviews that clashed with the perspectives of administrators. When we reframed our individual perspectives by appreciating and understanding administrator pressures, our program, Geometry in Construction, and ideas flourished. As we continue to spread our model of contextual learning, we constantly find ourselves balancing our needs with other stakeholders' needs, including students, parents, administration, the community, business and industry. Over time we have developed, implemented and replicated the Geometry in Construction program in multiple locations. We continue to collaborate locally in the creation of the "Algebra 2 with Automotive" program. Additionally, during the 2011-2012 school year, we will work with Seguin Independent School District in Texas on the development of Algebra 1 coupled with "Principles of Manufacturing." Even if you are not a trade and industry CTE teacher, we believe that organizing principles from our model are transferable to other content areas and translatable to success in education.

The Beginning of a Revolutionary Idea: Geometry in Construction

With no administrative support (except the district CTE director) and trapped in a car driving to and from Denver for a conference, we started brainstorming ideas. Armed with what we gathered from the conference, we eventually decided that based on our individual skill sets and our available school facilities, we wanted to create a program that would be fun and rigorous. We spent 16 months developing the program, which successfully launched during the 2006-2007 school year. Since that inaugural year we have achieved what many would agree is a great amount of success. Some of our key indicators of success are:

- Alignment of CTE with the National Common Core Math Standards through a contextual delivery method.

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- Improved annual math scores indicating higher averages than students enrolled in regular geometry classrooms.
- Skyrocketing female student enrollment in the construction program, with 51 percent enrollment during the 2011-2012 school year.
- Soaring CTE enrollment with 80 percent of all geometry students self-selecting to enroll in the program.
- Development of sustainable partnerships with various nonprofit organizations such as Habitat for Humanity.
- Creation of a self-funded program that no longer relies on diminishing and restrictive school budgets.
- Successful replication of the program to varying degrees with more than 50 sites trained nationwide.

Our Model for Success Is Simple

Throughout the years, we have been fortunate to be invited to deliver numerous presentations, trainings and keynote addresses. We've had countless visitors come to our site to see firsthand what we have developed. One question that comes up regularly is: what components of the program can be removed while still maintaining the same result? Initially, we really didn't know. However, after careful examination and reflection, we believe there are **three organizing principles** central to the success of our program:

1. Community-building
2. Contextualized math instruction and delivery
3. Appropriate, authentic, CTE-driven capstone project

Principle #1: Community-building (Inside and Beyond the Classroom)

Community-building is one area that is often overlooked in a modern classroom. Many teachers report that they just don't have time to deliver all of the standards if they spend time building community. In the classroom, community-building means facilitating relationships: student to student and student to teacher relationships. Visitors to our site see a classroom where students are seated in cooperative groups designed to optimize their math and construction experiences. A common misconception is that cooperative groups are nothing more than putting kids in a group and praying that they all work together. This could not be farther from the truth. Students working in cooperative groups must be trained to work together. Facilitation of various small group activities, which requires that each member of the group be involved, is critical. Additionally, the expectation of cooperative grouping must be reflected in the daily assignments, tasks and other duties you ask the students to carry out.

> "The Geometry in Construction curriculum is comprehensive, well done, well integrated, and totally worth the time and expense of training, planning and implementing this program."
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> —Melinda Ingersoll, assistant principal, CTE programs, Seguin, Texas.

In the program, we use team-building activities. A common misconception is that team-building is nothing more than playing a bunch of games. We agree with this statement *only* if team-building activities are facilitated *incorrectly*. The key to maximizing team-building is to spend an adequate amount of time processing the game and drawing parallels to the overall program. These activities, when done correctly, can help build relationships between all parties much faster than a normal classroom setting. Teachers who have replicated our program have reported that team-building techniques foster better relationships with their classes, resulting in fewer disciplinary incidents, increased attendance rates and heightened student engagement.

Beyond the classroom, community-building also involves re-educating the *local community* around this new practice. This includes administrators, fellow teachers, counselors, parents, and business and industry partners. Early in the process, the common misconception was that CTE diluted academic rigor. For example, parents hope their kids are excited about attending school and learn important skills for life after high school. For some this means college preparedness. For others, this means workforce readiness. Through the contextual approach to learning (explained in principle #2 below), we are able to meet both needs related to college preparedness and workforce readiness. [*Editor's note*: Please see this month's Classroom Connection on page 8 for an article on how to get students to work effectively in teams.)

Principle #2: Contextualized Math Instruction and Delivery

Another key component to the model is the contextual learning delivery method of rigorous math instruction. When we first started brainstorming possibilities for our partnership, we heard about James Stone from the National Research Center for Career and Technical Education (NRCCTE) and his work with the Math-in-CTE study. We eventually created a new model that has evolved from the NRCCTE model. For example, NRCCTE must have known that messing with the master schedule is a nearly impossible task. Hence, the NRCCTE study required that CTE teachers contextualize 10 percent of their entire class with math. Additionally, this math could be any level of math—from basic to calculus. We wondered, "If the NRCCTE received positive results at only 10 percent contextualization, what type of results could we get from attempting to **contextualize**

two content areas as close to 100 percent of the time as possible?" At 100 percent contextualization, we accomplish the following:

- *Team teaching*: We teach together. This means that the CTE teacher is active in the math classroom and the math teacher is active in the CTE class.
- *Class selection*: We deliberately combined Geometry and Construction because these two content areas are good fits for each other. We have since discovered a number of other classes that can be fully contextualized, including Algebra 2 with Automotive.
- *Curriculum*: After developing the Geometry in Construction program, we created a complete curriculum rather than a few contextual math lessons. In fact, we now train others to launch the Geometry in Construction program at their own school sites. Currently, there are approximately 60 total school sites nationwide trained since the summer of 2008. Replication looks slightly different based on local needs. However, similar success can be achieved through delivery of the same model and curriculum.

Principle #3: Selection of Capstone Project

The final organizing principle is selecting an appropriate authentic capstone project. In the case of Geometry in Construction, our capstone project is building a home for Habitat for Humanity. Annually, Habitat purchases the home from the school district for the cost of the program. These costs include building materials, field trips, tool replacements, etc. Typically, without any community support of material donations, we can build a house and run the program for approximately $45.00 per square foot. This piece of the program allows several things, including a source of annual funding which the school district does not have to provide for program survival.

▼ Students participating in team-building activities.

▲ The program was replicated in the Evergreen Public School district, Vancouver, Washington. The first house project was completed in June 2011.

Outcomes

As a result of drawing on these three organizing principles, we have noticed increased student, parent and community engagement and enthusiasm, including:

- Increased attendance rates and higher math homework completion rates from students. Students often request to volunteer extra hours after school and on weekends to work on the house.
- Parents choose to get involved in many ways, whether it is through donations of supplies, money and professional services. For example, one of our parents is a licensed electrician and has offered electrical expertise since the program's inception. Other times, this enthusiasm is evident when parents volunteer alongside their children to build the homes.
- Our community is comprised primarily of a large number of taxpayers who do not have school-aged children. Needless to say, passing bond and mill levy initiatives can be difficult. On numerous occasions, however, we have had taxpayers tell us, "This is exactly how we want our taxes spent." Additionally, we have created an avenue for numerous businesses to get involved to help support the school district and the community.

Looking Ahead

The potential for contextual delivery of CTE with math is endless. The sky is the limit, and we hope that you choose to embark on your own journey of contextualization. If you would like some support on how to contextualize CTE with core content, or if you are interested in learning more about "Geometry in Construction" and "Algebra 2 with Automotive," visit our Web site at **www.geometryinconstruction.org**, or attend one of our sessions at the ACTE Annual Convention in St. Louis, Missouri, on either November 17 or 18, 2011.

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